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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/489,846	01/24/2000	Hideya Takeo	Q56532	6337

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EXAMINER

EDWARDS, PATRICK L

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/489,846

Applicant(s)

TAKEO, HIDEYA

Examiner

Patrick L Edwards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7 and 9-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7 and 9-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 22 December 2004 has been entered.

Response to Arguments

2. The applicant's arguments, filed on 23 June 2004, have been fully considered. A response to these arguments is provided below.

Prior Art Rejections

Summary of Argument: Claims 1-5, 7, and 9-17 stand rejected under 35 USC 102e as being anticipated by Rogers et al (US 2002/0081006 A1). Applicant traverses this rejection, and argues that Rogers does not teach the limitations of claim 1 (see applicant's remarks pgs. 6-9). Specifically, applicant asserts that Rogers does not teach the claimed limitation of 'relating a result of the processed abnormal pattern to a result of the corrected abnormal pattern'.

Examiner's Response: The examiner respectfully disagrees. Rogers discloses detecting an abnormal pattern in an image, based on inputted image information (see the first sentence in paragraph [0042]). The claimed detecting step is analogous to the detection step 300 disclosed in the Rogers reference.

Rogers further discloses processing the detected abnormal pattern (see the 2nd and 3rd sentences of paragraph [0042]). The processes described in these two sentences correspond to the determination of a second set of suspicious detections S2 described in paragraph [0014]. Thus, the determination of S2 is analogous to the claimed step of "processing the detected abnormal pattern."

Rogers further discloses correcting the processed abnormal pattern for each of a plurality of items of the inputted image information (see the third sentence of paragraph [0014]): The formation of a third set of suspicious detections S3 by accepting or rejecting members of S2 is analogous to the claimed step of "correcting the processed abnormal pattern."

Moving on to the limitation in question, the Rogers reference discloses relating a result of the processed abnormal pattern S2 to a result of the corrected abnormal pattern S3. This act of relating occurs in the creation of a fourth set of suspicious detections S4. Rogers discloses that S4 is the union of sets S1 and S3 (see paragraph [0141]). We have already established that S3 is a subset of S2; it logically follows that the suspicious detection set S4 is the intersection of the set of all values in S2 and S3, with the set of values in S1. Written mathematically, we

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can say that $S4 = (S1 \wedge (S2 \wedge S3))$. By definition, this determination relates the processed abnormal pattern S2 with the corrected processed abnormal pattern S3.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5, 7, and 9-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Rodgers et al. (U.S. Patent Application Publication No. US 2002/0081006 A1).

With respect to claim 1, Rodgers et al. discloses detecting an abnormal pattern in an image, based on inputted image information (see paragraph [0042]: The reference describes detecting microcalcifications (i.e. abnormal pattern) in a digital mammogram.).

Rodgers further discloses processing the detected abnormal pattern (see paragraph [0042]: The reference describes filtering the image to reduce noise and then filtering the image using an optimized difference of Gaussians (DoG) filter to enhance the microcalcifications. These first two steps correspond to determining a second set of suspicious detections (S2) described in paragraph [0014].).

Rodgers further discloses correcting the processed abnormal pattern, for each of a plurality of items of the inputted image information (see paragraph [0014]: The formation of a third set of suspicious detections S3 by accepting or rejecting members of S2 is analogous to the claimed step of “correcting the processed abnormal pattern.”)

Rodgers further discloses relating a result of the processed abnormal pattern to a result of the corrected abnormal pattern, for each of the plurality of items of the inputted image information. This act of relating occurs in the creation of a fourth set of suspicious detections S4. Rogers discloses that S4 is the union of sets S1 and S3 (see paragraph [0141]). We have already established that S3 is a subset of S2; it logically follows that the suspicious detection set S4 is the intersection of the set of all values in S2 and S3, with the set of values in S1. Written mathematically, we can say that $S4 = (S1 \wedge (S2 \wedge S3))$. By definition, this determination relates the processed abnormal pattern S2 with the corrected processed abnormal pattern S3.

Rodgers further discloses storing the plurality of processed abnormal pattern results and the plurality of corrected abnormal pattern results (see paragraph [0046]: The reference describes that the digital images are stored on a computer-readable storage medium.).

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With respect to the added limitation that the relating and storing steps discussed above are performed “for each patient”: Rogers discloses that the steps are performed on a digital mammogram (see paragraph [0041]). The digital mammograms are—by definition—acquired from a patient. Thus, Rogers discloses the above steps “for each patient.”

With respect to claim 2, Rogers et al. discloses that quantitative evaluation of the detection processing is performed, on the basis of the stored plurality of processed abnormal pattern results and the stored plurality of corrected abnormal pattern results (see paragraphs [0014] and [0137]: The quantitative evaluation the relating described above. The CAD system outputs are incorporated with the radiologist’s analysis to optimize the overall sensitivity of detecting true positives. Further quantitative evaluations such as specificity and the positive predictive value are also determined from this data.).

With respect to claim 3, Rogers et al. discloses an abnormal pattern detection processing method comprising: detecting an abnormal pattern in an image, based on inputted image information (As described in the rejection of claim 1.); processing the detected abnormal pattern (As described in the rejection of claim 1.); performing a pattern reading assessment using the image information (see paragraph [0014]: The reference describes that a radiologist examines the suspicious detections of the CAD system and either rejects or accepts them, thus forming a third set of suspicious detections S3.); performing a pathologic assessment of the abnormal pattern (see paragraph [0014]: The reference describes that a radiologist reviews the image and reports a set of suspicious regions, S1 (i.e. a pathologic assessment of the abnormal pattern).); relating a result of the detected abnormal pattern processing and a result of the pattern reading assessment to a result of the pathologic assessment, for each of a plurality of items of the inputted image information (see paragraph [0014]: The reference describes that a set S4 is determined which is the union of S1+S3. Therefore, since S3 is formed on the basis of S1 and S2, and S4 is determined by relating S1 and S3, S4 is a relationship between a result of the detected abnormal pattern processing and a result of the pattern reading assessment to a result of the pathologic assessment.); and storing the plurality of processed detected abnormal pattern results, the plurality of pattern reading assessment results and the plurality of pathologic assessment results (As described in the rejection of claim 1.).

With respect to claim 4, Rogers et al. discloses that a quantitative evaluation of the pattern reading assessment is performed, on the basis of the stored plurality of pattern reading assessment results and the stored plurality of pathologic assessment results (As described in the rejection of claim 2).

With respect to claim 5, Rogers et al. discloses an abnormal pattern detection processing system, which detects (see Fig. 1: Block 300 which represents detecting clustered microcalcifications.) and processes an abnormal pattern (see Fig. 1: Block 600 which represents processing the results) in an image represented by image information on the basis of inputted image information, comprising: a means relating a result of the detection processing to a corrected detection processing result, for each of a plurality of items of image information (see Fig. 31: The combination of blocks 50 through 70 depict that the CAD system outputs, S2, are incorporated with the radiologist’s analysis to optimize the overall sensitivity of detecting true positives.), and storing the plurality of detection processing results and the plurality of corrected detection processing results (see paragraph [0046]: The reference

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describes the use of a 2 GB hard drive of a general-purpose computer for storing information); and evaluator means for performing quantitative evaluation of the detection processing on the basis of the plurality of results of detection processing and corrected detection processing results stored in the relating and storing means (This evaluation is the same evaluation as described in the rejection of claim 2. Since the reference describes a computerized system (see paragraph [0046]), then the computers processor acts as the evaluator means.)

With respect to claim 7, Rogers et al. discloses an abnormal pattern detection processing system, which detects and processes an abnormal pattern in an image represented by image information on the basis of inputted image information (As described in the rejection of claim 5 above.), comprising: a means relating a result of the detection processing and a result of a pattern reading assessment using the image information to a result of pathologic assessment concerning the abnormal pattern, for each of a plurality of items of the image information (As described in the rejection of claim 5 above), and storing the plurality of detection processing results, the plurality of pattern reading assessment results and the plurality of pathologic assessment results (As described in the rejection of claim 5 above.); and evaluator means for performing a quantitative evaluation of the pattern reading assessment on the basis of said plurality of pattern reading assessment results and the plurality of pathologic assessment results stored in said relating and storing means (This evaluation is the same evaluation as described in the rejection of claims 2 and 5. Since the reference describes a computerized system (see paragraph [0046]), then the computers processor acts as the evaluator means.).

With respect to claim 9, Rogers et al. discloses that the corrected abnormal pattern results comprise a determination of whether the processed abnormal pattern corresponds to at least one of a true positive, false positive, true negative and false negative (see paragraph [0137]: The reference describes the use of true positive, false positive, true negative and false negative to rate the detected clusters.).

With respect to claim 10, Rogers et al. discloses that quantitative evaluation comprises a ratio of a number of true results relative to a number of true and false results (see equations (11), (12), and (13): These equations represent sensitivity, specificity, and positive predictive value (PPV), respectively, which are all a ratio of a number of true results relative to a number of true and false results.

With respect to claim 11, Rogers et al. discloses that a sensitivity of the quantitative evaluation is determined by the ratio of true positives to a sum of true positives and false negatives (see equation (11), following paragraph [0133]).

With respect to claim 12, Rogers et al. discloses a specificity of the quantitative evaluation is determined by the ratio of true negatives to a sum of true negatives and false positives (see equation (12), following paragraph [0134]).

With respect to claim 13, Rogers et al. discloses a positive predictive value of the quantitative evaluation is determined by the ratio of true positives to a sum of true positives and false negatives (see equation (13), following paragraph [0138]).

With respect to claim 14, which is representative of claims 15, Rogers et al. discloses that the processing automatically determines whether the abnormal pattern exists or not based on a result of the detection (see paragraph

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[0042]: As described in the rejection of claim 1 above, the reference describes filtering the image to reduce noise and then filtering the image using an optimized difference of Gaussians (DoG) filter to enhance the microcalcifications. These first two steps correspond to determining a second set of suspicious detections, S2, described in paragraph [0014]. These processing steps are performed by the CAD system and are performed automatically. The processing steps determine a set of suspicious detections, which corresponds to determining whether the abnormal pattern exists or not.).

With respect to claims 16 and 17, which merely call for a system for performing the method of claims 14 and 15, respectively, Rodgers et al. discloses such a system as can be seen in Fig. 1.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

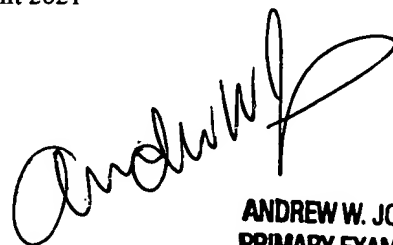
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick L Edwards

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**ANDREW W. JOHNS
PRIMARY EXAMINER**